

REMARKS

The Office Action objected to claim 25 as being of improper dependent form. The Office Action rejected claims 18-49 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The Office Action rejected claims 18-48 under 35 U.S.C. § 103(a) as being unpatentable over United States Patent 6,451,075 issued to Schoppe et al. (“Schoppe”) in view of United States Patent 3,106,194 issued to Cantwell et al. (“Cantwell”). The Office Action rejected claim 49 under 35 U.S.C. § 103(a) as being unpatentable over Schoppe in view of Cantwell in further view of U.S. Patent 6,183,703 issued to Hsu et al. (“Hsu”).

In this Amendment, Applicants have amended claims 18, 26, and 42. Applicants have canceled claim 25. Applicants have added new claims 50-52. Applicants do not surrender any equivalents to any amended limitation or elements of any claim. Accordingly, claims 18-24 and 26-52 will be pending after entry of this Amendment. Applicants respectfully request reconsideration of the rejections.

I. Objection to Claim 25

Applicants have canceled claim 25.

II. Rejection of Claims 18-49 Under § 112, 2nd paragraph and New Claims 50-52

The Office Action rejected claims 18-49 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Specifically, the Office Action cited claims 18, 26, and 42 as each providing a broad range or limitation together with a narrow range or limitation. Applicants have amended claims 18, 26, and 42 to eliminate the narrower ranges. Applicants have added dependent claims 50-52 to claim the narrower ranges that were eliminated from claims 18, 26, and 42. Applicants respectfully submit that claims 50-52 are fully supported by the specification and are

valid for at least the same reason as claim 18. Applicants respectfully request that the rejections of claims 18-49 under § 112, 2nd paragraph be withdrawn and claims 18-24 and 26-52 be allowed as soon as possible.

III. Rejection of Claims 18-49 under 35 U.S.C. § 103

The Office Action rejected claims 18-48 under 35 U.S.C. § 103(a) as being unpatentable over Schoppe in view of Cantwell. The Office Action rejected claim 49 under 35 U.S.C. § 103(a) as being unpatentable over Schoppe in view of Cantwell in further view of Hsu. Claims 19-24 and 26-49 are dependent directly or indirectly on claim 18. Claim 25 has been canceled.

Claim 18 recites a fuel for feeding spark ignition engines, in particular those fitted in aircraft, having an F4 octane number at least equal to 130 and a reduced level of aromatic compounds. The fuel contains substantial quantities of a first hydrocarbons base (B1) essentially constituted by isoparaffins comprising 6 to 9 carbon atoms. The level of isooctanes in the isoparaffinic hydrocarbons cut (B1) is greater than 70% by mass. The fuel also contains a second hydrocarbons base (B2) also constituted by isoparaffins comprising 4 or 5 carbon atoms and, optionally, by other hydrocarbons and additives customary for this type of fuel, in a quantity and quality sufficient for the fuel to comply with the specifications in force. The fuel also contains at least 5.0% by volume of a hydrocarbons base (B3) essentially composed of cycloparaffins comprising 6 to 8 carbon atoms. The ratio R of the quantities by volume (B1+B2)/B3 is greater than 2.0.

A. Schoppe and Cantwell are not obvious to combine

Applicants respectfully submit that it would not have been obvious to one of ordinary skill in the art to combine the cited references. The Office Action stated

It would have been obvious to one of ordinary skill in the art at the time of invention replace the 15% portion of aromatic xylene in the fuel composition as disclosed by Schoppe et al. with a cyclohexane portion as taught by Cantwell et al. as it is well known in the art that cycloparaffins can be successfully substituted for aromatic compounds in raising the octane

levels of gasoline while being more environmentally friendly (as evidenced by Demirel et al., pg. 83-84). Further, it amounts to nothing more than substituting interchangeable components of fuel in an otherwise known fuel composition to achieve an expected result.

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However, Applicants respectfully submit that Schoppe and Cantwell describe dissimilar fuels used for dissimilar purposes. Therefore, one of ordinary skill in the art would not find it obvious to combine their teachings, as described in the following two paragraphs.

Schoppe describes blends of aviation fuel with low rates of lead, comprising at least 50% in volume of isooctane. Those blends can contain aromatic hydrocarbons with C₇-C₁₁ (claim 13) and/or aliphatic hydrocarbons with 4C (claim 15). As mentioned by the Examiner, Schoppe does not describe nor suggest that aviation fuel blends could contain cycloparaffins.

Cantwell describes a process deemed to suppress knock in spark ignition (e.g., in internal combustion engines), consisting of vaporizing an alkali metal compound in the combustion chamber, the compound being conveyed in an inert gas carrier and put in the presence of air and fuel in the chamber. Among the fuels described in the examples, the fuel noted (J) in column 11 contains cycloparaffins, n-paraffins, aromatic hydrocarbons and olefins. The RON of this fuel is equal to 93.4 and its MON is equal to 81.1. The fuel noted (J) does not contain iso-paraffins, in contrast to the fuel according to the invention, which contains a large amount of iso-paraffins. Its F4 octane index can be calculated the following way: the F4 index is equal to $2800/128 - \text{octane index} = 2800/128 - 81.1 = 59.7$, i.e. its F4 index is much lower than the one claimed in the invention, which is of at least 130. Accordingly, Applicants respectfully submit that the fuels according to Cantwell are not aviation fuels, unlike those according to the present invention, and also unlike fuels according to Schoppe. Applicants respectfully submit that it would not have been obvious to one of ordinary skill in the art to combine the aviation fuel of Schoppe with the non-aviation fuel of Cantwell.

Furthermore, the teachings of Cantwell do not disclose the use of cycloparaffins in isolation, but rather in combination with other elements not present in the aviation fuel of Schoppe. The cycloparaffins of Cantwell were a percentage of a completely different fuel mixture. For at least the above reasons, even the hindsight combination of Schoppe and Cantwell would not lead to the claimed inventions, i.e. to the specific combinations of (B1), (B2), and (B3), as claimed.

B. Substitution of Cyclohexane for Xylene is not obvious

The Office Action also cites Demirel, Belma et al., Thermodynamic probability of the conversion of multiring aromatics to isoparaffins and cycloparaffins, Fuel Processing Technology, Elsevier, 1998, 55, 83-84 (“Demirel”) as disclosing that cycloparaffins can be substituted for aromatic compounds. *See*, Office Action, page 5. However, Demirel merely discloses that cycloparaffins and aromatic compounds both have the property of raising the octane level of gasoline. Demirel does not disclose, teach, or even suggest the substitution of any particular cycloparaffin for any particular aromatic compound in any particular fuel mixture for any particular type of engine.

Furthermore, the substances that the Office Action suggests substituting have very different properties. For example, xylene, which is disclosed as part of a fuel mixture described in Schoppe, is a liquid at a different temperature range from the cyclohexane disclosed in Cantwell. Xylene is a liquid at temperatures hotter and colder than temperatures that would cause cyclohexane to boil or freeze. Applicants respectfully submit that substitution of elements with such different properties would not be obvious to one of ordinary skill in the art.

Accordingly, Applicants respectfully submit that the cited reference does not render claim 18 unpatentable. As claims 19-24 and 26-49 are dependent directly or indirectly on claim 18, Applicants respectfully submit that claims 19-24 and 26-49 are patentable over the cited reference for at least the reasons that were discussed above for claim 18. In view of the foregoing, Applicants

respectfully request reconsideration and withdrawal of the § 103 rejections of claims 18-24 and 26-49.

CONCLUSION

In view of the foregoing, Applicants respectfully submit that all the claims, namely claims 18-24 and 26-52, are in condition for allowance. Reconsideration of the rejections is requested. Allowance is earnestly solicited at the earliest possible date.

Applicants have submitted all known required fees. Applicants believe that no additional fee is required for the submission of this Amendment and Response. However, in the unlikely event that the Commissioner determines that additional fees, extensions of time, and/or other relief are required, Applicants petition for any required relief. Moreover, Applicants authorize the Commissioner to charge the cost of such petitions and/or other fees due in connection with the filing of this document to Deposit Account No. **50-3804** referencing **CABH.P0004**.

For these reasons, and in view of the above amendments, this application is now considered to be in condition for allowance and such action is earnestly solicited.

Respectfully Submitted,

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Date

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